Claims

1. A container device for the long-term storage of hazardous material, particularly for the ultimate disposal of nuclear fuel, comprising

an elongate, cylindrical inner containment body (A) having a casing wall (12), an upper end wall (13A), a lower end wall (13B), a first compartment (14) defined by the casing wall and the end walls for accommodating at least one hazardous-material body (F) formed by the hazardous material or containing or supporting the hazardous material, particularly a hazardous-material body comprising a bundle of rod-shaped nuclear fuel elements, and support means (15, 16) in the compartment (14) supporting the hazardous-material body centrally in the inner compartment and spaced from the casing wall and the end walls, and

a cylindrical outer containment body (D) having a casing wall (30), an upper end wall (31A) and a lower end wall (31B), a second cylindrical compartment (32) which is defined by the casing wall and the end walls and within which the inner containment body (A) is supported and spaced from the casing wall and end walls of the outer containment body (D), wherein

a passageway extends through at least one of the end walls of the outer containment body (D) and opens into the second compartment (32) to pass self-compacting concrete into the second compartment,

a passageway extends through at least one of the end walls (13A, 13B) of the inner containment body (A) and opens into the first compartment (14), the passageway communicating with the second compartment (32) so that self-compacting concrete can flow from the second compartment into the first compartment, and

a passageway for discharging excess of self-compacting concrete from the top of the outer compartment is provided in the upper end wall of the outer containment body.

2. A container device according to claim 1, comprising an intermediate containment body (B) having a casing wall (18), an upper end wall (19A), a lower end wall (19B) and a third compartment (22) which is defined by this casing wall and these end walls and within which the inner containment body (A) is supported and spaced from the casing and end walls of the intermediate containment body (B), wherein a passageway extends through at least one of the end walls of the intermediate containment body and opens into the third compartment (22), the passageway communicating with the second compartment (32) so that self-compacting concrete can flow from the second compartment into the third compartment.

3. A container device according to claim 3, comprising a further intermediate containment body (C) having a casing wall (24), an upper end wall (25A), a lower end wall (25B) and a fourth compartment (26) which is defined by this casing wall and these end walls and within which the further intermediate containment body (C) is supported and spaced from the casing and end walls of the further intermediate containment body (C), wherein a further passageway extends through at least one of the end walls of the further intermediate containment body (C) and opens into the fourth compartment (26), the further passageway communicating with the second compartment (32) so that self-compacting concrete can flow from the second compartment into the fourth compartment.

4. A container device according to claim 1 or 2 or 3, wherein the passageway extending through at least one of the end walls of the outer containment body (D) comprises a conduit (33) which extends through the upper end wall (31A) of the outer containment body (D) and opens into the second compartment in the vicinity of the bottom thereof.

5. A container device according to claims 3 and 4, wherein for each of the intermediate containment body (B) and the further intermediate containment body (C) the passageway extending through at least one of the

end walls comprises a conduit (20, 27), which extends through the upper end wall (19A, 25A) of respectively the intermediate containment body (B) and the further intermediate containment body (C) and opens in respectively the third (22) and the fourth (26) compartment in the vicinity of the bottom thereof, and further comprises an opening which is provided in that upper end wall and opens into respectively the fourth and the second compartment.

6. A method for manufacturing a container device (11) for hazardous material, particularly nuclear fuel elements arranged in at least one bundle, e.g. in one or more fuel assemblies (F), wherein the a hazardous-material body (F) formed by or containing or supporting the hazardous material, is introduced and fixed in a defined position in an essentially cylindrical container (A), the length of which is substantially larger than the length of the hazardous-material body, with a spacing provided between side and end walls (12, 13A, 13B) of the container, and is embedded throughout its length and at its ends in a casting compound, which substantially completely fills the space between the hazardous-material body (F) and the side and end walls (12, 13A, 13B) of the container and then to set,

comprising the steps of

placing the hazardous-material body (F) in a cylindrical inner containment body (A) having a casing wall (12), an upper end wall (13A) and a lower end wall (13B), a first compartment (14) defined by the casing wall and the end walls, and supporting the hazardous-material body (F) centrally in the first compartment and spaced from the casing and end walls thereof, at least one of the end walls having a passage (17A, 17B) communicating with the first compartment (14),

placing the inner containment body (A) in a cylindrical outer containment body (D) having a casing wall (30), an upper end wall (31A) and a lower end wall (21B) and a second compartment (32) which is defined by

the casing and end walls of the second containment body, and supporting the first containment body (A) centrally in the second compartment and spaced from the casing and end walls thereof, at least one of the end walls having an inlet and an outlet passage communicating with the second compartment (32),

introducing self-compacting concrete in the second compartment (32) through the inlet passage and causing the self-compacting concrete to fill the first and second compartments completely and allowing excess self-compacting concrete to exit through the outlet passage.

7. A method according to claim 6 wherein the self-compacting concrete is introduced in the second compartment (32) through a conduit opening in the vicinity of the bottom wall (31B) of the outer containment body (D).

8. A method according to claim 6 or 7 wherein the inner containment body (A) is placed in an intermediate containment body (B) having a casing wall (18), an upper end wall (19A), a lower end wall (19B) and a third compartment defined by these walls, wherein the intermediate containment body (B) is supported in the outer containment body (D) spaced from the casing and end walls thereof and wherein the self-compacting concrete is caused to pass from the outer containment body into the intermediate containment body (B) to fill it completely.

9. A method according to claim 8 wherein the intermediate containment body (B) is placed in a further intermediate containment body (C) having a casing wall (24), an upper end wall (25), a lower end wall (25B) and a fourth compartment (26) defined by these walls, wherein the further intermediate containment body (C) is supported in the outer containment body (D) spaced from the casing and end walls thereof and wherein the self-

compacting concrete is caused to pass from the outer containment body into the further intermediate containment body (B) to fill it completely.